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CLAIMS

1. An electronic device material, comprising: at least an electronic device substrate and a silicon oxynitride film disposed on the substrate,

5 wherein the silicon oxynitride film contains nitrogen atoms in a large amount in the vicinity of the oxynitride film surface when the nitrogen content distribution in the thickness direction of the silicon oxynitride film is examined by an SIMS (secondary ion
10 mass spectrometry) analysis.

2. An electronic device material according to claim 1, wherein the silicon oxynitride film has been obtained by the nitridation of a silicon oxide film.

3. An electronic device material according to
15 claim 1 or 2, wherein the maximum value of the nitrogen content based on the SIMS analysis in the thickness direction of the silicon oxynitride film is from 10 to 30%.

4. An electronic device material according to
20 claim 3, wherein the maximum value of the nitrogen content based on the SIMS analysis in the thickness direction of the silicon oxynitride film is from 20 to 30%.

5. An electronic device material according to any
25 one of claims 1 to 4, wherein in the distribution curve of the nitrogen content based on the SIMS analysis, the half-width of the curve is 2 nm or less.

6. An electronic device material according to any
30 one of claims 1 to 5, wherein in the distribution curve of the nitrogen content based on the SIMS analysis, the peak of the curve is present within 1 nm from the film surface of silicon oxynitride film.

7. An electronic device material according to any
35 one of claims 1 to 6, wherein the electronic device substrate is a semiconductor substrate.

8. An electronic device material according to any one of claims 1 to 7, wherein the electronic device

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substrate is a substrate mainly comprising silicon.

9. An electronic device material according to any one of claims 1 to 8, wherein the silicon oxynitride film is a gate insulating film of an MOS-type transistor.

5 10. A process for producing an electronic device material, comprising: irradiating a silicon oxide film disposed on an electronic device substrate with a plasma based on a process gas containing at least a nitrogen gas, thereby forming a silicon oxynitride film containing
10 nitrogen atoms in a large amount in the vicinity of the oxynitride film surface when the nitrogen content distribution in the thickness direction of the oxynitride film is examined by an SIMS (secondary ion mass spectrometry) analysis.

15 11. A process for producing an electronic device material according to claim 10, wherein the plasma is a plasma based on a plane antenna member (RLSA).